Solutions to Practice Test 1
Key - 2017

1. $-7 = -3x + 25$
$-25 \quad -25$

$\downarrow$

$\frac{-9}{-3} = \frac{-3x}{-3} \Rightarrow \boxed{3 = x}$

Solution: (A)

Remember ■ = +1 ▬ = x

□ = -1 ▭ = -x

So, you are looking for

▬ = ■ ■ ■

2. x = nickels = \$0.05

$q = x - 14$ (quarters) $= 0.25(x - 14)$

Total = 8.80

- the number of nickels = x, which has a value of 0.05 or $0.05x$
- then, the number of quarters is $0.25(0.05x - 14)$

50 = 8.80 = # nickels + # quarters

$\downarrow$ $\downarrow$

Solution (B) $0.05x + 0.23(x - 14)$

3. $2(x-5) = -8x$

1. Remove the bracket by doing Distributive property:

$$2(x-5) = -8x$$

$$2x - 10 = -8x$$

2. To solve an equation means to end up with the variable on one side (positive and by itself), and a numerical value on the other side.

To do this, use {inverse operations} and move all the x-terms to one side, and all numerical terms to the other side

$$2x - 10 = -8x$$

Solution: $\boxed{x = 1}$

$$2x + 8x = 10$$

So, solve: $\frac{10x}{10} = \frac{10}{10} \Rightarrow \boxed{x = 1}$

To prove:

$$2(1-5) = -8(1)$$

$$2(-4) = -8$$

$$-8 = -8$$

4. $18 + 12y \geq 15y$

Remember: Inequalities are Treated as equations, so the same procedure is used:

- Move the y-terms to one side

$18 + 12y \geq 15y$

$18 \geq 15y - 12y$

$18 \geq 3y$

Solution: B

• Notice that To solve this, you must divide by 3, a positive number, so THE DIRECTION OF THE INEQUALITY IS NOT Reversed!

$\frac{18}{3} \geq \frac{3y}{3}$ SAME AS $6 \geq y \Rightarrow \boxed{y \leq 6}$

to prove

- choose any number less than 6 ⇒ 5
- Use original equation:

$18 + 12(5) \geq 15(5)$

$18 + 60 \geq 75$

$\boxed{78 \geq 75}$ it works!

5. $3m - 1 > -4$

- First thing to notice, because this inequality is ">", the number line must have an unfilled dot.
- Thus, A and C are out.
- Solve the inequality

$$3m - 1 > -4$$

$$3m > -4 + 1$$

$$\frac{3m}{3} > \frac{-3}{3}$$ Now divide by 3

$$\boxed{m > -1}$$

- sign is not Reversed!

- Look at B and D

B → Reads as any number greater than -1

D → Reads as any number lesser than -1

- Since $m > -1$,

then m is any number greater than -1

Solution: (B)

6. Solve $2x - 3 > 5$

$$2x > 5 + 3$$

$$2x > 8 \Rightarrow \frac{2x}{2} > \frac{8}{2}$$

$$\boxed{x > 4}$$

Solution is any number greater than 4.

So, Solution: 7

7. $2x + 3y + 2750$

- A constant is a polynomial Term not attached to a variable

$2x \longrightarrow x$ is variable
2 is numerical coefficient

$3y \longrightarrow y$ is variable
3 is numerical coefficient

$2750 \longrightarrow$ not attached to variable, so it is the constant

Solution: (B)

8. Remember ■ $= x^2$ □ $= -x^2$

▬ $= x$ ▭ $= -x$

▪ $= +1$ ▫ $= -1$

Look at the picture:

- there are 2 □, then $= -2x^2$
- there are 8 ▮, then $= +8x$
- there are 6 ▫, then $= -6$

So: $-2x^2 + 8x - 6$ Solution: (D)

9. $2x + 5 + 3x + 2 + x + 6$

- First, always make sure that you ORDER the polynomial (highest exponent first).
- Pair the "like terms"

Solution = 6

Coefficients are $2, 3, 1 = 6$

$\underbrace{2x + 3x + 1x}_{\text{like Terms}} + \underbrace{5 + 2 + 6}_{\text{like Terms}}$

$6x + 13 \rightarrow$ The Coefficient is 6

Solution: (C)

10. ADDITION OF POLYNOMIALS

• Remember: when adding and subtracting polynomials, you can only PAIR "like TERMS".
Like Terms → have same Variable
And
Same Exponent

$$\Rightarrow \begin{array}{ll} 4x^2 + 3x - 9 & + \\ 6x^2 + 2x + 2 & \text{(Rearranged)} \\ \hline 10x^2 + 5x - 7 & \end{array}$$

11. SUBTRACTION OF POLYNOMIALS
↳ "ADD THE OPPOSITE"

$$(4x + 3y) - (2x - 4y)$$

1. Re-ordered not needed

ADD THE OPPOSITE

$$(4x + 3y) + (-2x + 4y)$$

So:

$$\begin{array}{ll} 4x + 3y & + \\ -2x + 4y & \text{(the opposite)} \\ \hline +2x + 7y & \end{array}$$

Solution: (A)

12. $\dfrac{2x^2 - 3x}{x}$ ⇒ Division of polynomials:

Rewrite as: $\dfrac{2x^2}{x} - \dfrac{3x}{x}$ so, diminate

or $2(x^{2-1}) - 3(x^{1-1})$

$2x^1 - 3(x^0)$

↳ $2x - 3(1)$

$\boxed{2x - 3}$

Solution: (C)

13. $(2x)(5xy)(3y)$ - Multiplication of exponents
- x with x
- y with y
- numbers with numbers

$(2x)(5xy) = 10(x^{1+1})y = 10x^2y$, Then

$(10x^2y)(3y) \rightarrow 10 \times 3 = 30$

OR

Solution: (C) $30x^2y^{(1+1)} = 30x^2y^2$

14. $(3y - 4x - 6) \cdot (-5x)$ Distributive Property

(Keep number with number
x with x
y with y)

$-15yx + 20x^{(1+1)} - 30x$

$-15yx + 20x^2 - 30x$ (Terms are not like terms, so they don't combine)

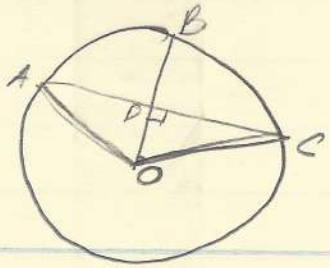
Solution: (D)

15. $11p^5 + 12p^4 + 6p + 2 \cdot (7q^2r^3)$ Keep number/number
q with q
p with p
r with r

$77p^5q^2r^3 + 84p^4q^2r^3 + 42pq^2r^3 + 14q^2r^3$

The coefficient of q^2r^3 → 14

Solution: (14)



$OD = 4.3$

$AC = 13.4$

16. $BD = ?$

- Notice that OB is a Radius
- OC is also a Radius
- Also $OB = OD + BD$

Since we have $OD = 4.3$

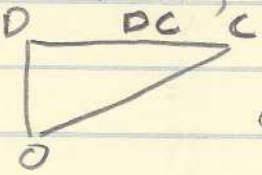
Then $BD = OB - OD$

↳ Radius, so

$$BD = OC - 4.3$$

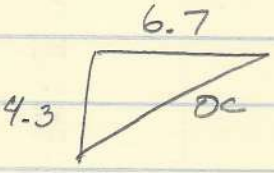
Solution: (A)

- Since $AC = 13.4$, then



$$DC = \frac{13.4}{2} = 6.7$$

or

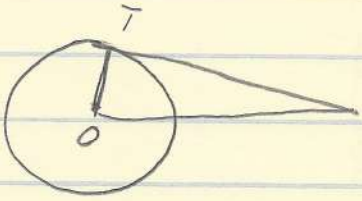


$$OC = \sqrt{(4.3)^2 + (6.7)^2} = \sqrt{63.38} = 7.96$$

- So

$$BD = 7.96 - 4.3 = 3.66 \approx 3.77$$

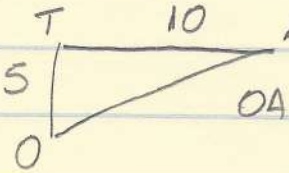
17.



$AT = 10$

Radius $= OT = 5$

Solution (C)



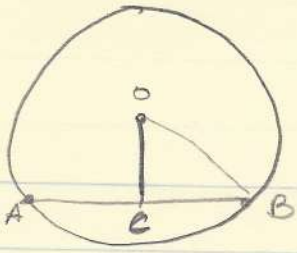
$OA = \text{hypotenuse} = \sqrt{(10)^2 + (5)^2} = \sqrt{100+25}$

$$OA = \sqrt{125} \Rightarrow OA = 11.18 \approx 11.2$$

Now $5\sqrt{3} = 5 \times \sqrt{3} = 5 \times 1.73 = 8.66$

$5\sqrt{5} = 5 \times \sqrt{5} = 5 \times 2.23 = 11.18$

So $5\sqrt{5} = 11.18$



$AB = 8$
$OC = 3$

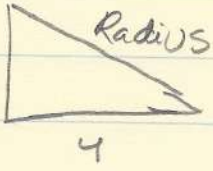
Since OC is the bisector of AB, Then AB is cut into 2 equal lines of 4 units

18.

- Make a Triangle. You'll notice OB = Radius.

So

Solution
$R = 5$



Radius ↓ hypotenuse $= \sqrt{(3)^2 + (4)^2}$

$= \sqrt{9+16} = \sqrt{25} = 5$

Then $\boxed{\text{Radius} = 5}$

19. Use Area of Cylinder $= 2\pi r^2 + (2r\pi \times h)$

Cylinder 1
$d = 6$ cm, $r = 3$ cm

Cylinder 2
$d = 12$ cm, $r = 6$ cm

Solution (6)

Area Cylinder 1 $= 2\pi(3)^2 + (2\pi(3) \times 10)$

$= 18\pi + 60\pi = 78\pi$

$= 78 \times (3.14) = 245.04$

Area Cylinder 2 $= 2\pi(6)^2 + (2\pi(6) \times 25)$

$= 72\pi + 300\pi$

$= 372\pi = 372(3.14) = 1168.67$

Overlap
↳ 2x (area of bottom circle of Cylinder 1)

$= 2 \times (\pi r^2) = 2 \times (\pi 3^2) = 18\pi$

So Total Area $= (78\pi + 372\pi) - 18\pi$

$= 432\pi = 1357.16$

20. The insulator covers the block of ice, but it has 2 openings for the pipe to enter and exit. so the area of the insulator is:

Area of block − Area of openings for pipe

Area of Block = (Area of one face) × 6

$= (6 \times 6)\ cm^2 \times 6 =$

$= 36\ cm^2 \times 6$

$= 216\ cm^2$

One opening is Area of pipe circle $(r = 1.5)$

Area of pipe circle $= \pi r^2 = \pi (1.5)^2 = 2.25\pi$

BUT, There are 2 openings:

$2 \times (2.25\pi) = 4.5\pi$

So:

Area of Insulator = Area of Block − Area of openings

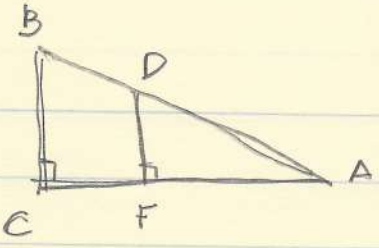
$= 216\ cm^2 - 4.5\pi$

$= 216\ cm^2 - 14.13\ cm^2$

$= 201.86\ cm^2$

$\hookrightarrow 201.9\ cm^2$

Solution (B)

21. 

Similar Triangles have:
- Equal angles OR
- Same scale factor

So $AC = AF$

$AB = AD$

$DF = BC$

$\frac{AC}{AF} = \frac{AB}{AD} = \frac{BC}{DF}$

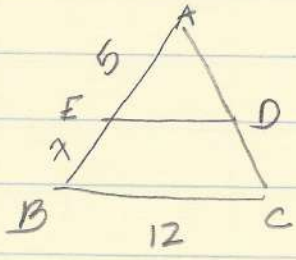
Solution: (D)

22. Similar figures have – Same angles
– Same scale factor

↳ Scale factor = Ratio of lengths of Corresponding Sides

So, Solution: (D)

23. Similar Triangles



$DE = ?$ $\quad \frac{BC}{DE} = \frac{BA}{EA}$

$\frac{12}{DE} = \frac{12}{5}$

$DE = \frac{12 \times 5}{12} \Rightarrow \boxed{DE = 5}$

Solution = (ED = 5)

24. Solve by elimination:

Ethics: nothing seems to indicate Sheldon is going to use this information for other than he indicates

Solution: (A)

Privacy: It's up to recipients to decide

Use of language: We don't know how the questions were phrased

Cost: It seems it would be really expensive to send a letter to each home

25. Since it can be assumed that parents will help with the baking, and the sell occurs during the day of the Christmas concert, then adults, teachers and students should be asked.

Solution: (D)

26.
- the population IS identified
- the question seems EASY
- If they plan to get all students, then it indicates that the amount of boys vs. girls is NOT relevant
- the opinion of one school may NOT be a true representation

Solution: (D)

27. Notice that there are not percentages indicated, so no valid conclusion can be obtained in Regards to numbers.

May → • not valid as numbers are not shown → False
• not valid as numbers are not shown → False

Melody → • Half the circle is walking + taking the transit → TRUE
• It looks like more school bus than transit bus → False

Deborah • More students do not take the transit bus → False
• car + transit bus + bike → True

Amy • It is not true that more than half of students walk or take the school bus → False
• the number of students riding the car seems equal to amount of people biking and taking transit bus → True

↓

Amy seems to be correct

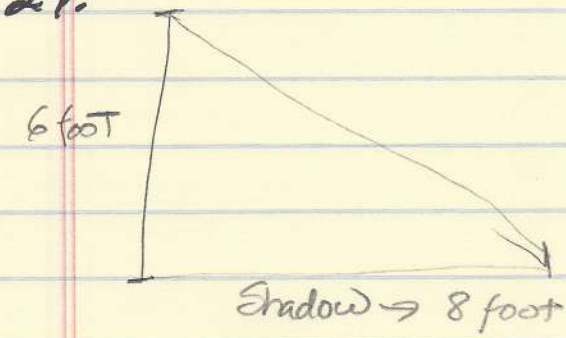
Solution: (D)

28. As you can see, this is an enlargement. this means the scale factor is greater than 1.

$$\text{Scale factor} = \frac{\text{New}}{\text{old}} = \frac{9 \text{ units}}{3 \text{ units}} = 3$$

Solution: (B)

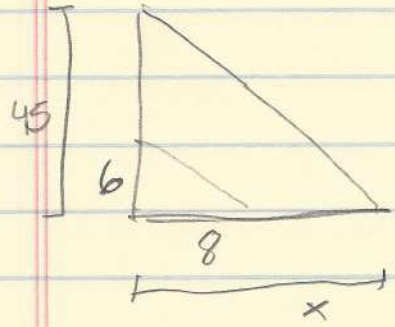
29. 11:30 am



45 feet building?

• Similar Triangles, So

Solution: (C)



$$\frac{6}{8} = \frac{45}{x}$$

$$x = \frac{45 \times 8}{6} = \frac{360}{6} \text{ feet} = 60 \text{ feet}$$

30. B is (2, -1) → Translated 3 up and 4 Left

Then B' is (-2, 2)

Solution: (B)

31. The only figure that is asymmetrical is Figure C.

Solution: (C)

32. Since the tesellation matches 4 times when Rotated, then the ORDER of ROTATION is 4

Solution: 4

33. $a^5 = 3^5$ means $a = 3$

so, $(2a)^7 \rightarrow (2 \times 3)^7 = (6)^7$

Solution: (D)

34. #cards = $C = 2^n - 1$ n = Shows attended

$C = 2^9 - 1 = 512 - 1 = 511$

$511 \div 50 = 10.22$

So, he needs 11 cases

Solution = 11 cases

35. $5^3 \times 5^6 \times 5^4$

$\hookrightarrow 5^{(3+6+4)} = 5^{13}$

Solution = (A)

36. $3^4 \times 3^7 \div 3^2$

$\hookrightarrow \frac{3^4 \times 3^7}{3^2} = \frac{3^{(4+7)}}{3^2} = \frac{3^{11}}{3^2}$

$3^{(11-2)} = 3^9$ Solution = (B)

37. $(-4 \times (-2)^3)^3 = -4^3 \times (-2)^9$

$= -64 \cdot -512$

$= 32,768$

the negative here does not belong to the 4. So $((-1)^4(4)^3 \times (-2)^3)^3$

$= (-1)^3(4)^3 \times (-2)^9$

$= (-1)(64) \times (-2)^9$

$= (-64) \times (-512) = 32,768$

Solution: 32,768

Also:

$4 = 2^2$ so:

$(-(2^2)^4 \times (-2)^3)^3 = -2^6 \times (-2)^9$

$= -64 \times -512 = 32,768$

38. $0.50 per orange = $0.25 per banana
↳ x

$0.50 x + $0.25 bananas
Profit ↳ .2 ↳ Profit .2
↓ ↓
$1.00 $0.50

So, the profit equals to
$1.00 + $0.50 = $1.50
and since he bought the same amount of both fruits:
30/1.50 = 20
↳ This includes 1 orange and 1 banana

Solution: (C)

39. $6\frac{1}{2}\,m = \frac{13}{2}\,m$

$1\frac{1}{5} = \frac{6}{5}\,m \quad 2\frac{1}{2}\,m = \frac{5}{2}\,m \quad 2\frac{2}{5} = \frac{12}{5}\,m$
$\times 2 \quad \times 5 \quad \times 2$

$\frac{13}{2} \times 5 = \frac{65}{10}\,m$ Solution: (C)

So $\frac{65}{10} - \left(\frac{12}{10} + \frac{25}{10} + \frac{24}{10}\right)$

$\frac{65}{10} - \frac{61}{10} = \frac{4}{10}\,m$ → Simplified is

$\frac{2}{5}\,m$

40. $(3.8 - 5.8)^4 - (-3)^3 - 5.6 \times 4.9$

BEDMAS → Brackets First, so

$3.8 - 5.8$ is first

Solution : (D)

41. $21.4 \times (64.1 - 37.8)$

- Because you can write the brackets, then, count each character.

Solution : (16)

42. 'Perfect Square?

↳ "Square Roots are whole numbers.

$\sqrt{209} = 14.45$ $\sqrt{1524} = 39.03$

$\sqrt{1060} = 31.62$ $\sqrt{1764} = 42$

So, 1764 is a perfect square

Solution : (D)

43. $\sqrt{1} = 1$ (Rational)

$\sqrt{48}$ = non-Terminating, non-Repeating ⇒ Irrational

$\sqrt{12}$ = non-Terminating, non-Repeating → Irrational

$\sqrt{75}$ = non-Terminating, non-Repeating → Irrational

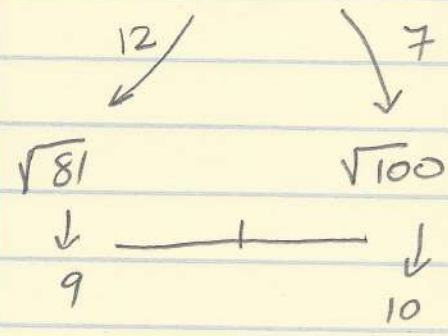
Solution: (A)

44. $\sqrt{45}$ over 6.5

36 ___ 49 So, 6.7 is logical

Solution : (C)

45. $\sqrt{93}$



93 closer to 100, so $\sqrt{93}$ is over 9.5. the one solution that matches this is 9.6

Solution: (C)

46. $15/h

every two months → increase of 0.80/h

- $21.40/h

so $21.40 − $15.00 = $6.40 more

$6.40/0.80 = 8 8×2 = 16 months

Sasha

Solution: (B)

47.

$x + (42 + x) = 140$

Solution (D)

48. Make a table of values:

$y = 2x + 5$

x	y
0	5
1	7
2	9

- B matches for x=1, 2, etc.
- C and D can not be true because x increases as y increases
- A indicates that when y=5, x=1 which is NOT TRUE

Solution: (B)

49. Using the graph,
when term number is 9,
the term value is 28. Solution: (B)

50. Highest probability is in Chinook Lake → 43 %

$$0.43 = \frac{43}{100} = 43\%$$

Solution: (B)